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Use Of Efficient And Affordable Technologies In Checkmating The Existence Of Hazardous Waste In Ilorin, Nigeria

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----------ABSTRACT----------
To enhance the development of clean and good health environment, this research deals with the use of efficient and affordable technologies in checkmating the existence of hazardous waste. Human activities, such as production and processing lead to the production of wastes (solid, liquid or gas), which must be minimized because of their harmful effect on human life and destruction caused on the environment. Six hundred (600) copies of questionnaires were distributed with Two hundred (200) copies each to the Three (3) Local Government Areas in Ilorin, Kwara State, Nigeria; Various effects of hazardous wastes on human health and the environment were identified to promote state of health of the people and the environment and proper enlighten placed on the menace of hazardous waste. The role of the agencies responsible for the controlling and monitoring of hazardous waste were examined, which shows more laxity on the part of municipal authority in discharging its responsibilities. This then call for awaken on these bodies in discharging their responsibilities and adequate funding from the government. Also a separate disposal site such as landfill and incinerator should be constructed for hazardous wastes and programmes on reuse and recycling of recoverable materials be encouraged.

KEYWORDS: *hazardous waste, efficient, affordable, municipal, landfill, incinerator, recycling.*

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I. INTRODUCTION

The industry, government and the general public have become increasingly aware of the need to respond to hazardous waste problem, which had grown steadily over past years. In 1980, United State (U.S) Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - the Superfund law - to provide for liability, compensation, cleanup and emergency response for hazardous substances released into the environment and the cleanup of abandoned and uncontrolled hazardous waste disposal sites. The Superfund Amendments and Reauthorization Act (SARA) of 1986 extend CERCLA and added new authorities under Title III of SARA that included Emergency Planning, Community Right-to-Know and Toxic Chemical Release Reporting. The Resource Conversation and Recovery Act (RCRA) of 1976 set the standards for waste handling, storage and disposal.

Hazardous waste is generated from a wide range of activities especially from the manufacturing sector. Notable among them are the textiles industries (spinning, weaving etc.); Food and beverages (fish processing, slaughter houses, oil processing, cocoa processing etc.); Petroleum and petro chemical industry; Wood processing industry; and Paints and Chemical industry (Anku, 2000). As a result of their characteristic quality of being corrosive or inflammable, or reactive and toxic in nature, such wastes are termed as hazardous wastes. In spite of new technologies, improved production, waste treatment and management strategies like reduce, reuse and recycle, there is still a certain quantity of waste that need to be disposed in a scientific way. Similarly, many household products contain the same chemicals as strictly regulated industrial wastes and pose environmental problems. The household hazardous waste (HHW) consists of the waste material resulted from items like; tube lights, dry battery cells, mercury vapor lamps, nail polish remover, blades, pesticides, chemicals, out dated drugs, discarded vehicles, used oil from various sources vehicles like; bikes, cars etc, electronic waste and bio-medical waste resulted from in house medication. Although the quantities of chemicals disposed by individual households may be small, the number of households in a town are many, and the amount of waste adds up (lakshmikantha, 2007).

Until recently, government policies did not require appropriate precaution for waste, and few were taken. Simply disposing of waste was the standard and relying on the seeming inexhaustibility of the environment was the method. Gradually, exposure to hazardous substances occurred outside the workplace via various environmental pathways. Various hazardous wastes in an environment were identified and methods of improvement for controlling and monitoring determined, which promote safe hygiene in various households.

II. MATERIALS AND METHODS

The descriptive survey research techniques such as Questionnaires and photographic survey were used as means of gathering information. Six hundred (600) copies of questionnaires were distributed with Two hundred (200) copies each to the Three (3) Local Government Areas in Ilorin, Kwara State, Nigeria; Ilorin East Local Government Area, Ilorin West Local Government Area and Ilorin South Local Government Area respectively. The questionnaires were distributed to the Residential Buildings (37.5%), Market Places (50%) and Motor Parks (12.5%) of Local Government Areas. The features noticed regarding household hazardous wastes in these areas were, heaps of Household waste (HHW) dumped indiscriminately on the streets as shown in Plate A below, which can cause hazard to human health.

III. RESULT AND DISCUSSION

The results on the questionnaires analyses based on its validity, sex, age, occupation, qualification of the respondents, hazardous wastes generated by the respondents, disposal method of hazardous waste, public awareness on the effect of hazardous waste, storage validity of hazardous waste, household waste bin, package of different waste generated, generation of monthly hazardous waste and collection of hazardous waste generated by municipal authority are presented in Table 1–12 respectively with hazardous waste generated in Figure 1..

Table 1, shows that 600 (100%) questionnaires were distributed to residential buildings, market places and motor parks, where 573 (95.5%) only were completed and returned, and 27 (4.5%) were not returned, which arises from the motor parks. This simply resulted from some vehicles that left the parks during the collection of the questionnaires. Table 2, present the sex distribution of the respondent where 223 (38.92%) were males and 350 (61.08%) were females. This difference in population is an indication of more females than the males respondents in the study Area (Ilorin), which correspond with result of the National Population Census 2006.

Table 3, shows the combined population of ages of respondents between 11-40 years (88.83%) as the category of people mostly involved in hazardous wastes generation and management. Table 6, indicates that Torchlight/Phone batteries is the most Hazardous waste generated by the people 30.02%, due to its level of usage as a result of frequent interruption of electricity. Table 7, shows that 52.88% of the respondents are using waste bin for waste collection, due to the fact that waste bins are located at some specific spot along the road side of the metropolis. While 14.48% and 32.64% are using open ground and dump site respectively. This is due to improper specified location for dumping of Hazardous Wastes and lack of enlightenment about the menace of Hazardous Wastes. Table 12, shows that 6.63% of the respondents agreed to punctuality of municipal authority in the collection of Hazardous Wastes, while 93.37% disagreed vehemently, which is an indication that the municipal authority do not adhere strictly to their responsibility effectively.

PLATE 1: An Open Dump Site with Hazardous Waste any Other Waste at Post Office Motor Park, Ilorin East Local Government Area.

Table 1: Validity of the Questionnaire

Description	Frequency	Percentage
No of questionnaire distributed	600	100%
No of questionnaire returned	573	95.5%
No of questionnaire not returned	27	4.5%

Table 2: Sex Distribution of the Respondents (Households)

Description	Frequency	Percentage
Male	223	38.92%
Female	350	61.08%
Total	573	100%

Table 3: Age Distribution of the Respondents (Households)

Description	Frequency	Percentage
11-20 years	198	34.55%
21- 30 years	156	27.23%
31-40 years	155	27.05%
41-50 years	40	6.98%
51-60 years	21	3.66%
61- above	3	0.56%
Total	573	100%

Table 4: Occupation of the respondents (Households)

Description	Frequency	Percentage
Farming	12	2.09%
Trading	78	13.61%
Civil / Servant	131	22.68%
Industrialist	110	19.02%
Others	242	42.23%
Total	573	100%

Table 5: Qualification of the Respondents (Households)

Description	Frequency	Percentage
No formal education	15	2.62%
Primary school	40	6.98%
WAEC / Grade II	148	25.83%
NCE / ND	198	34.55%
HND / B.Sc	155	27.05%
Higher degree	17	2.97%
Total	573	100%

Table 6: Hazardous Wastes Generated by the Respondents (Households)

Description	Frequency	Percentage
Phones / Torchlight batteries	172	30.02%
Paint	28	3.49%
Disinfectant	5	0.87%
Fertilizers	12	2.09%
Blades	110	19.20%
Fluorescent tubes	50	8.73%
Gas cylinder	68	11.87%
Flea shampoos and powders	89	15.53%
Out dated medicine / drugs	138	24.08%
Pesticides (herbicides and insecticides)	163	28.45%
Nail polish removal	42	7.33%
Household cleaners and polishes	92	16.06%
Sprays	133	23.21%
Thermometers	3	0.52%
Vehicle batteries	25	4.36%
Waste / used oil from various sources like; Bikes, Cars and so on.	31	5.41%
Electronic waste from TV, VCD, DVD, Computer and so on.	98	17.10%

Table 7: Disposal Method of Hazardous Waste

Description	Frequency	Percentage
Waste bin	303	52.88%
Open ground	83	14.48%
Dump site	187	32.64%
Total	573	100%

Table 8: Public Awareness on the Effect of the Hazardous Waste.

Description	Frequency	Percentage
Awared	367	64.05%
Not Awared	206	35.95%
Total	573	100%

Table 9: Storage Validity of Hazardous Waste Household Waste Bin

Description	Frequency	Percentage
1-2 days	110	19.20%
2-3 days	132	23.04%
3-4 days	174	30.36 %
A week	157	27.40%
Total	573	100%

Table 10: Package of Different Waste Generated

Description	Frequency	Percentage
Hazardous Waste Only	58	10.12%
Hazardous Waste and Other Waste	515	89.88%
Total	573	100%

Table 11: Generation of Monthly Hazardous Waste

Monthly	Frequency	Percentage
Less than 50kg	537	93.72%
Between 50-100kg	34	5.93%
More than 100kg	2	0.35%
Total	573	100%

Table 12: Collection of Hazardous Waste Generated by Municipal Authority

Description	Frequency	Percentage
Regular	38	6.63%
Not Regular	535	93.37%
Total	573	100%

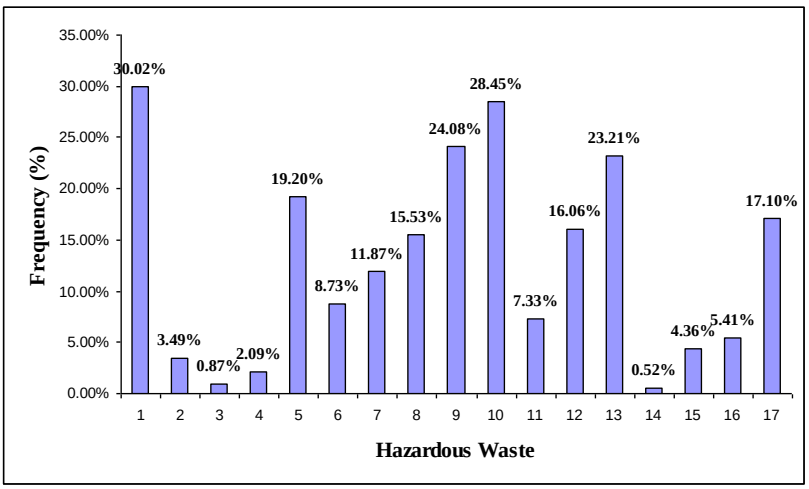

Figure 1: Histogram for the Hazardous Wastes Generated

IV. CONCLUSION

The need to respond to hazardous waste generation, collection and disposal have grown steadily over the years with proper awareness to the general public. Ilorin as the capital of Kwara State cannot be left out in ways of combating the menace as most of the households used covered waste bin as method of hazardous waste collection. Also, majority of the people did not adopt separate method of disposing hazardous waste generated from other wastes.

However, the activities of Kwara State Environmental Protection Agency (KWEPA) and Kwara State Waste Management Cooperation (KWMC) did not reflect a proper monitoring and control of hazardous waste generated, due to laxity of municipal authority in discharging their responsibility. Therefore, lack of adequate awareness on the general public and proper enlighten about the menace of hazardous waste can lead to an outbreak of diseases such as cholera, typhoid fever and so on that affects the environment. Sequel to the conclusion drawn, the following recommendations were made: The need for an effective waste management from an agency responsible for waste discharge should be enhance and separate disposal site such as landfill and incinerator for only Hazardous waste far away from the residential areas for healthy environment. Public awareness on the existence of Hazardous waste and its effects on human health and the environment should be adequately carried out and a programmes on Reuse and Recycling of recoverable materials (Lead acid and dry cell battery) should be encouraged**.**

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